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December 7, 2020

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1001 "I" Street, Sacramento, CA 95814

RE: Pacific Gas and Electric Comments on Proposed Amendments to the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers, Aerosols-Propellants and Foam End-Uses Regulation

This letter comprises the comments of the Pacific Gas and Electric Company (PG&E) in response to the California Air Resources Board (CARB) Proposed Amendments to the Prohibitions on Use of Certain Hydrofluorocarbons (HFCs) in Stationary Refrigeration, Chillers, Aerosols-Propellants and Foam End-Uses Regulation ("Proposed Amendments").[1]

PG&E is one of the largest utility companies in the Western U.S., serving approximately 16 million customers. As an energy company, we understand the potential of high-efficiency equipment to cut consumer costs and improve grid reliability while maintaining or increasing consumer utility of the equipment. We are also proud to be the first dual fuel utility to support the state's efforts to advance efficient all-electric new construction when it is feasible and cost-effective through California's Energy Code (Title 24, Part 6)[2].

We appreciate CARB's proactive actions to ensure that California meets its greenhouse gas (GHG) emissions reduction goals. Furthermore, we agree that success demands a multi-pronged approach including building electrification paired with an increasingly renewable power supply and improving efficiency in new and existing buildings.[3] We support the general direction of CARB's proposed rulemaking for stationary air conditioning equipment. We are also a signatory to a multi-stakeholder letter ("Multi-stakeholder Letter") submitted in response to the Proposed Amendments, encouraging CARB to engage with stakeholders to allow for a temporary exemption from CARB's HFC phase-down for highly

[1] https://ww2.arb.ca.gov/rulemaking/2020/hfc2020
[2] TN#: 233632 to CEC Docket Number : 19-BSTD-03
https://efiling.energy.ca.gov/GetDocument.aspx?tn=233632&DocumentContentId=66209
[3] Slide 4 of presentation from CARB's Technical Working Group Meeting: Stationary AC Rulemaking, March 6, 2019 - https://ww2.arb.ca.gov/sites/default/files/2020-03/Notice Technical Working Group_2019_03_06.pdf

efficient technologies that cannot use refrigerants classified as "A2L"[4] by the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) under the current version of safety standards governing refrigerant use.

In addition to the comments made in the Multi-stakeholder Letter, we offer the following comments for consideration:

We support an auditable and enforceable compliance pathway to offset the continued use of R410A through January 1, 2025 in exchange for use of reclaimed refrigerant from 2022 to 2030.

As outlined in the Staff Report: Initial Statement of Reasons (ISOR) supporting the Proposed Amendments[5], all but one of the currently available refrigerant alternatives with GWP less than 750 used in stationary air-conditioning (AC) equipment are categorized by ASHRAE as "A2L" refrigerants. Use of A2L refrigerants in the U.S. is governed by safety standards ASHRAE 34, ASHRAE 15 and UL 60335-2-40.

These safety standards have been updated to allow the use of A2L refrigerants in some AC products. However, these safety standards have not been adopted into California's Building Code. The State Fire Marshal is expected to come to a conclusion as to a code change proposal recommending adoption of these safety standards by December 2020. Should the State Fire Marshal recommend adoption of ASHRAE 15-2019 and UL 60335-2-40 3rd Edition into the California Building Code, then original equipment manufacturers (OEMs) will have two years to adapt their portfolio of products sold in California to use A2L refrigerants by the January 1, 2023 effective date of the Proposed Amendments for Stationary AC.

We note that OEMs typically direct their product development investments to products with the best return on investment. OEM product development cycles usually take three years. A compliance pathway will give OEMs flexibility to accelerate the transition to low GWP refrigerants for the products where investment makes the most business sense, while allowing the typical product development period for adaptation of other products. This compliance pathway has the potential to minimize disruption to California's AC supply chain, while meeting CARB's GHG reduction goals and establishing a market for reclaim of R410A refrigerant, which could support future restrictions on use of virgin R410A refrigerant for servicing existing equipment mentioned in the ISOR[6].

We note that the refrigerant reclaim market has enabled the successful phase-down of ozone depleting substances (ODS) by providing refrigerant for servicing existing equipment after the sales ban of virgin ODS. It is our understanding that the refrigerant reclaim market employs a robust recordkeeping process, tracking origin of refrigerant by cylinder, and reports their activities to the Environmental Protection

[4] The ASHRAE 34 Standard Committee determines toxicity and flammability classification. A2L refrigerants are a class of refrigerants that have lower toxicity and flammability than A2 or A3 refrigerants but higher than A1.
[5] California Air Resources Board Staff Report: ISOR, Section F-2 "What are the Compliance Options? – Compliance Options for Stationary Air Conditioning (AC)," Oct. 20, 2020
[6] California Air Resources Board Staff Report: ISOR, Section IX. "Evaluation of Regulatory Alternatives, D – Future Considerations, 1. Sales prohibition of new refrigerant above a threshold GWP", Oct. 20, 2020

Agency (EPA). We also point to the American Carbon Registry's methodology for certifying reclaim of HFC refrigerants[7] for offsetting GHG emissions as evidence of the validity of the approach.

Given that the compliance pathway mentioned in the ISOR would involve use of R410A in the near-term, with the resulting GHG emissions to be offset in the medium- to long-term, we strongly support CARB's proposed direction of ensuring that any non-compliance be subject to strict liability penalties.

In summary, given the delays in updating California's Building Code to support use of "A2L" refrigerants, we support an auditable and enforceable compliance pathway that allows OEMs to offset the continued use of R410A in some products in their portfolio through January 1, 2025 while meeting California's GHG reduction goals and establishing a market for reclaim of R410A refrigerant.

We note that the refrigerant leakage rates for variable refrigerant flow (VRF) heat pump systems suggested in the Stakeholder Proposal from EIA are inconsistent with literature estimates of 1-4%.

We recognize that any reductions in GHG emissions from high efficiency, all-electric equipment operation is offset by any GHG emissions associated with refrigerant leakage. As such, we encourage CARB to rely on the best available data in choosing equipment refrigerant leakage rates used in CARB's GHG emissions inventory forecast model.

We note that the VRF industry has made significant efforts to limit refrigerant leakage across the supply chain including in manufacturing, transportation and installation. Best practices include air tightness and pressure resistance inspection before charging systems, gas leak inspection after charging; post-packaging / pre-shipping gas leak inspection; designing equipment to withstand effects of vibration during transport without damage to refrigeration circuit; and installer training certification. In our review of published studies of annual leakage rates for VRF systems, we found annual leakage rates in the range of 1-4%,[8,9,10] which is lower than the leakage rates suggested by EIA.

We encourage CARB to engage stakeholders on developing a pathway to allow California to benefit from refrigerant-containing heat pump technologies while minimizing the impacts of refrigerant leaks.

The ISOR notes that in the future "CARB may consider regulations to limit the GWP of refrigerants used in these heat pumps to avoid a potential increase in HFC emissions and leapfrog to low-GWP alternatives to avoid locking in HFC-containing equipment over another equipment lifecycle."[11] We note that all of the appliances described in the ISOR including heat pump water heaters, clothes dryers and pool heaters, are emerging technologies in the U.S. market and represent U.S. market share of less than approximately

[7] https://americancarbonregistry.org/carbon-accounting/standards-methodologies/certified-reclaimed-hfc-refrigerants/certified-reclaimed-hfc_v1-1_sep-2018.pdf

[8] http://www.environment.gov.au/system/files/resources/bd7fa5d0-8da1-4951-bd01-e012e368d5d0/files/cold-hard-facts3.pdf

[9] http://www.ammonia21.com/files/decc-refrigerants-heat-pumps.pdf

[10] https://docplayer.org/16730140-2013-annual-conference-of-the-institute-of-refrigeration-lec-leakage-energy-control-system-agenda.html

[11] California Air Resources Board Staff Report: ISOR, Section IX "Evaluation of Regulatory Alternatives, D. Future Considerations," Oct. 20, 2020

two percent. We recommend extreme caution in attempts to push these technologies to leapfrog to low-GWP alternatives. With such limited market share, and a lack of alignment between global safety standards and safety standards adopted in the U.S., there is a significant risk of manufacturers deciding to withdraw these products from the California market. Lack of access to these products in California would severely limit the state's ability to meet our long-term GHG reduction goals through building electrification.

In conclusion, we reiterate our support for CARB's efforts in establishing a GWP limit on refrigerants used in new stationary air conditioning equipment and thank CARB for the opportunity to contribute to the process.

Sincerely,

/s/

Fariya Ali